

1971 OPERATING
SUMMARY

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MOORE TOWNSHIP (CORUNNA)

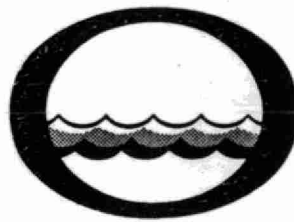
WATER POLLUTION CONTROL PLANT

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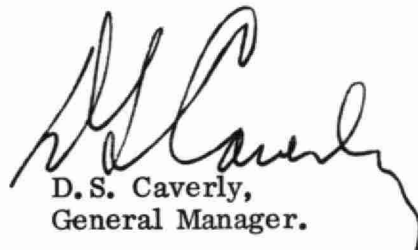



Water management in Ontario

Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in this summary.


D. S. Caverly,
General Manager.


D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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MOORE TWP. - CORUNNA
WATER POLLUTION CONTROL PLANT

operated for

THE TOWNSHIP OF MOORE

by the

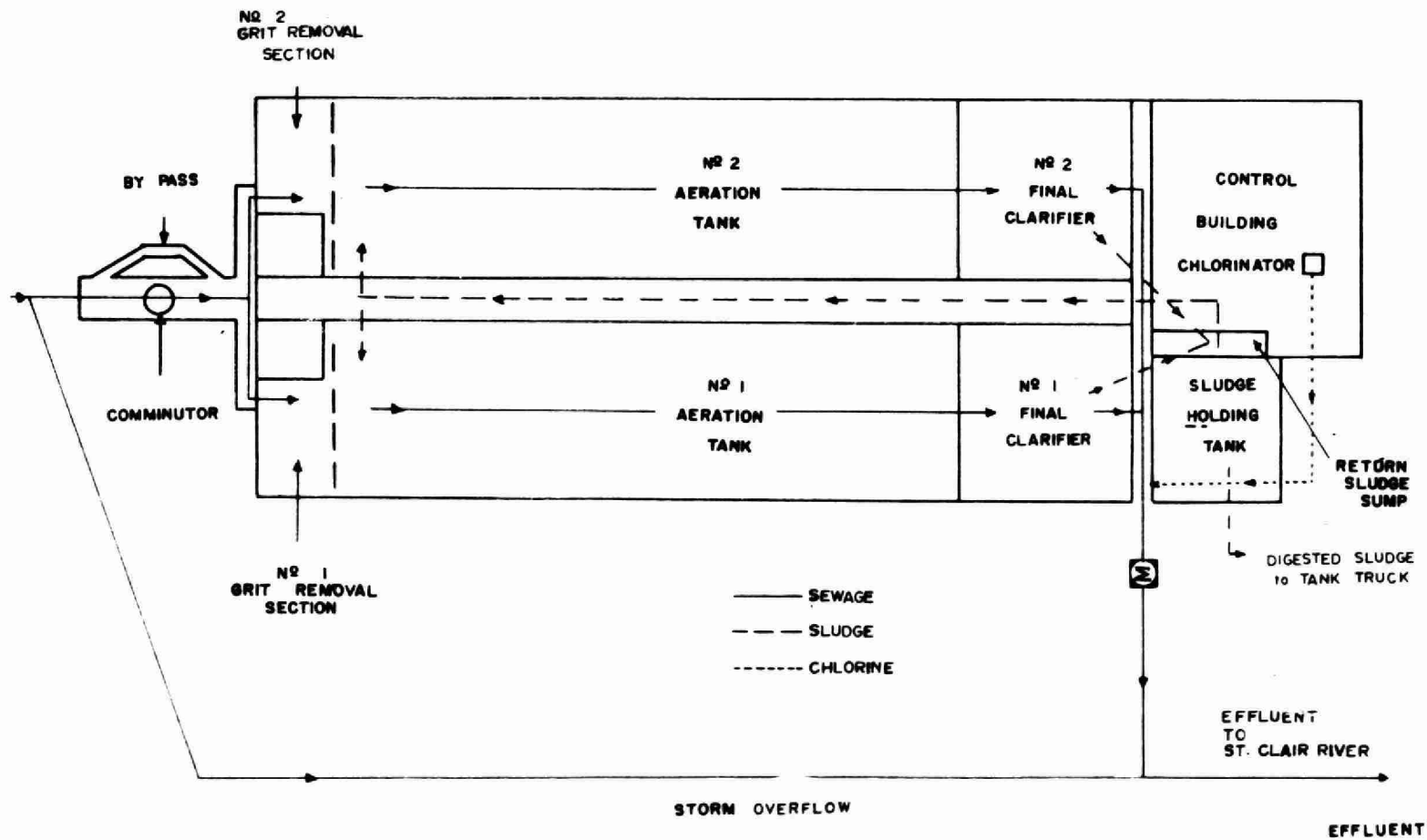
ONTARIO WATER RESOURCES COMMISSION

1971 ANNUAL OPERATING SUMMARY

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MOORE TOWNSHIP (CORUNNA) WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO. 2-0088-61

TREATMENT Extended Aeration

DESIGN FLOW 0.32 mgd

DESIGN POPULATION 4,000

BOD - Raw Sewage 150 mg/l
- Removal 90-95%

SS - Raw Sewage 150 mg/l
- Removal 90-95%

PRETREATMENT

Comminution

Type: Worthington comminutor
Size: One Model 15-C-4

Grit Removal

Type: C. P. Aer-Degritter with air lift
Size: 3780 gal
Retention: 17 min

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Single pass
Size: Two 84' x 17' x 14.25' (avg)
(40,698 cu ft or 254,000 gal)
Retention: 24.0 hours

Air Supply

Type: Sutorbilt
Size: Two 1000 cfm

Diffusers

Type: C. P. Spargers
Spacing: 22 per tank @ 20" c-c

Secondary Sedimentation

Type: Dorr
Size: Two 22' x 22' x 12½' swd
(75,300 gal)
Retention: 5.7 hours
Loading: Surface, 330 gal/ft²/day
Weir, 2,350 gal/ft/day

CHLORINATION

Type: W & T, Manual
Size: One 100 lb/day

Chlorine Contact Chamber

- in outfall

OUTFALL

196' of 48" dia corrugated pipe to
St. Clair River

SLUDGE HANDLING

Type: Sludge holding tank (decanted)
Size: One 17' x 17' x 15' (23,000 gal
@ 12.8' depth)

'71 Review

GENERAL

The Moore Township Water Pollution Control plant is of the extended aeration type designed for a hydraulic loading of .32 mgd and an organic loading of 480 pounds BOD per day. Screening, comminution, grit removal, aeration, settling, chlorination, waste sludge storage and truck loading facilities are provided.

The plant is located on the St. Clair River, upstream and upwind of the Police Village of Corunna, which it serves. Also included in the project is a complete sewer system and two pumping stations equipped with submersible pumps. Only one half of the aeration section is now being used for treatment. The additional capacity is held in reserve for storage of storm flows.

During 1971 the plant was very well run, and no major operating difficulties were experienced.

EXPENDITURES

The total operating cost for the complete project for 1971 was \$20,573.87, an increase of 11 percent over 1970. The cost per million gallons treated was \$488.00 and the cost per pound of BOD removed was 37 cents. The increase in cost per pound of BOD removed was due to increased salary costs, payment of \$500.00 to the Township of Moore for fill material and to the reduction in BOD concentration in the raw sewage.

PLANT FLOWS and CHLORINATION

During 1971 a total of 46.98 million gallons was treated at the plant, representing a decrease of 5 percent over 1970. Using the yearly average flow the plant operated at 37.5 percent of design capacity. Using the maximum daily flow the plant operated at 84.4 percent of design capacity.

Chlorination of the final effluent is carried out year-round. An average of 298 pounds of chlorine per month was required for an average dosage rate of 7.9 milligrams per litre to maintain a residual of at least 0.5 mg/l.

PLANT EFFICIENCY

Both the raw sewage BOD and suspended solids concentrations decreased to 129 mg/l from the 1970 values. The percentage removal was 94 and 92 percent respectively, resulting in a removal of 55,100 pounds of BOD and 54,500 pounds of suspended solids. Grit removal averaged 2.2 cubic feet per million gallons which was essentially unchanged from 1970.

SLUDGE DISPOSAL

The 246,000 gallons of waste sludge pumped to the holding tank were reduced to 91,000 gallons by aeration and decanting. An average of 45 cubic yards of sludge per month was hauled away by truck for disposal.

AERATION

In 1971, the average MLSS concentration was 6360 mg/l ranging from 4,900 mg/l to 7,700 mg/l on monthly averages.

The amount of air used for each pound of BOD removed was 9,500 cubic feet. The increase over the 1970 figure of 7,500 was due to the lower BOD loadings and to the fixed blower capacity.

CONCLUSIONS

During the past year, a highly efficient treatment was maintained. The structures, equipment and grounds were well cared for and no serious breakdowns were encountered.

As the hydraulic and organic loading at the plant are 37.5 percent and 32.1 percent of the design loadings, expansion of the plant is not expected for a good many years, if present growth rates are maintained.

PROJECT COSTS

2-0088-61	
NET CAPITAL COST (Final)	\$762,209.92
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>335,710.16</u>
Long Term Debt to OWRC	<u>\$426,396.59</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>88,396.59</u>
Net Operating	\$ 20,573.87
Debt Retirement	4,485.00
Reserve	3,542.71
Interest Charged	<u>23,922.73</u>
TOTAL	\$ <u>52,224.31</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 26,413.64
Deposited by Municipality	3,542.71
Interest Earned	<u>1,795.35</u>
	\$ 31,751.70
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>31,751.70</u>

PROJECT COSTS

2-0169-64	
NET CAPITAL COST (Final)	\$66,115.03
DEDUCT - Portion financed by CMHC/MDLB (Final)	<u>47,569.00</u>
Long Term Debt to OWRC	<u>\$18,546.03</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1971	\$ <u>3,254.29</u>
Net Operating	\$ -
Debt Retirement	185.00
Reserve	220.16
Interest Charged	<u>1,020.13</u>
TOTAL	\$ <u>1,425.29</u>

RESERVE ACCOUNT

Balance @ January 1, 1971	\$ 1,767.34
Deposited by Municipality	220.16
Interest Earned	<u>119.74</u>
	\$ 2,107.24
Less Expenditures	<u>-</u>
Balance @ December 31, 1971	\$ <u>2,107.24</u>

1971 COSTS

OPERATING COSTS

● PAYROLL	5 2 %
● FUEL	NIL %
● POWER	2 1 %
● CHEMICALS	3 %
● GENERAL SUPPLIES	3 %
● EQUIPMENT	3 %
● REPAIRS & MAINTENANCE	3 %
● SUNDRY	1 2 %
● WATER	1 %
● TRAVEL	2 %

TOTAL ANNUAL COST

NET OPERATING	3 9 %
DEBT RETIREMENT	8 %
RESERVE	7 %
INTEREST	4 6 %

YEARLY OPERATING COSTS

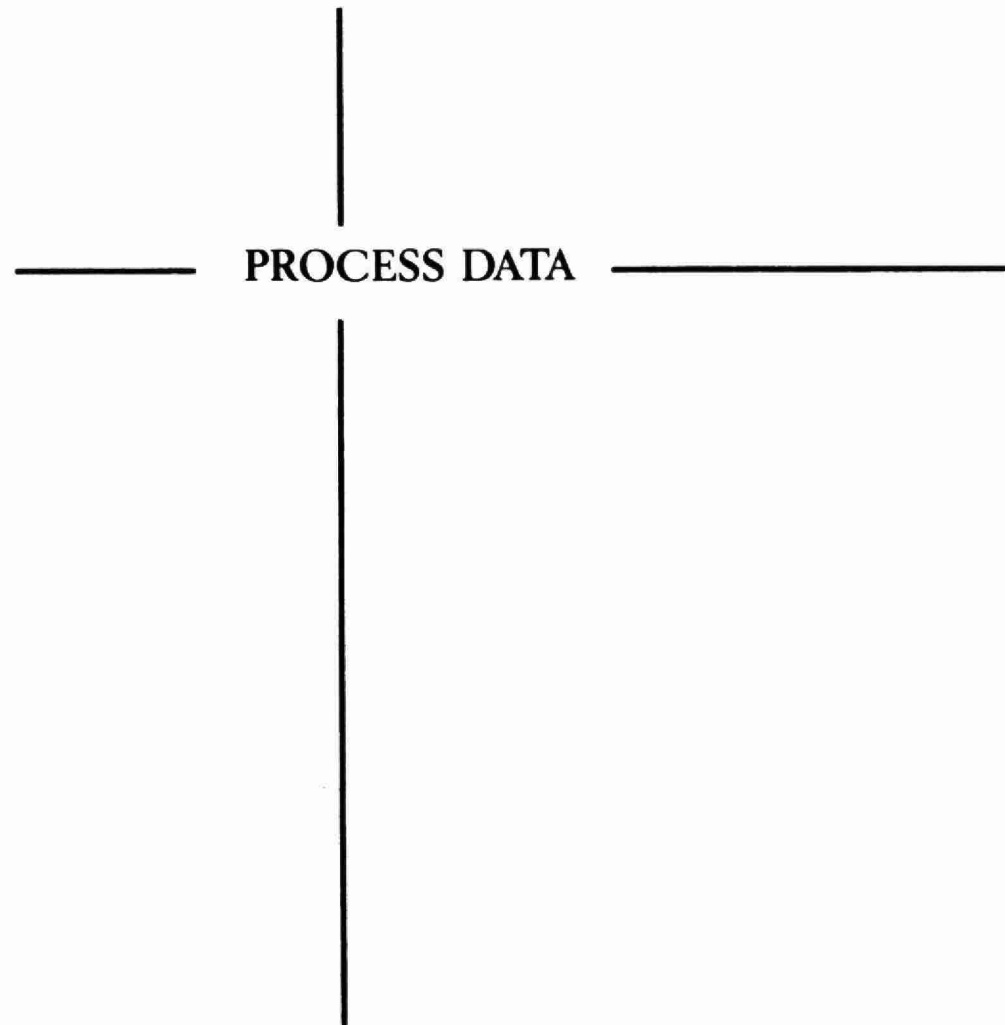
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	¢ per lb BOD
1967	42.49	\$14,853.48	\$349.61	24 cents
1968	39.94	16,554.63	414.49	21 cents
1969	44.81	16,333.25	364.50	22 cents
1970	46.27	18,529.81	400.90	27 cents
1971	45.98	20,573.87	447.45	37 cents

MONTHLY OPERATING COSTS

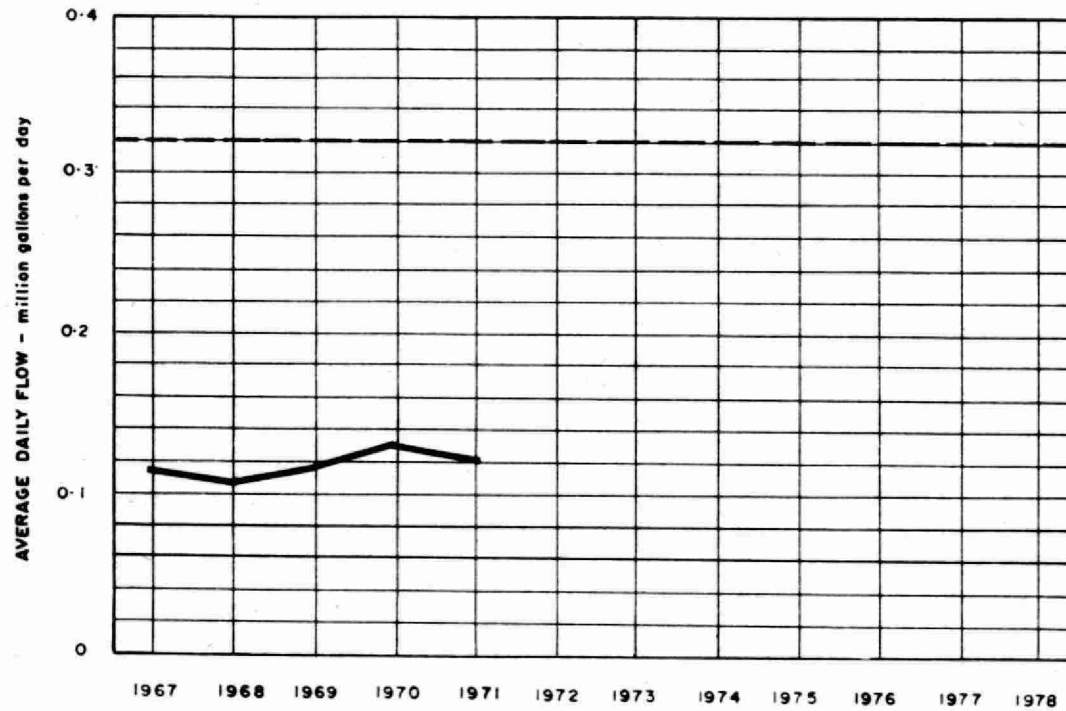
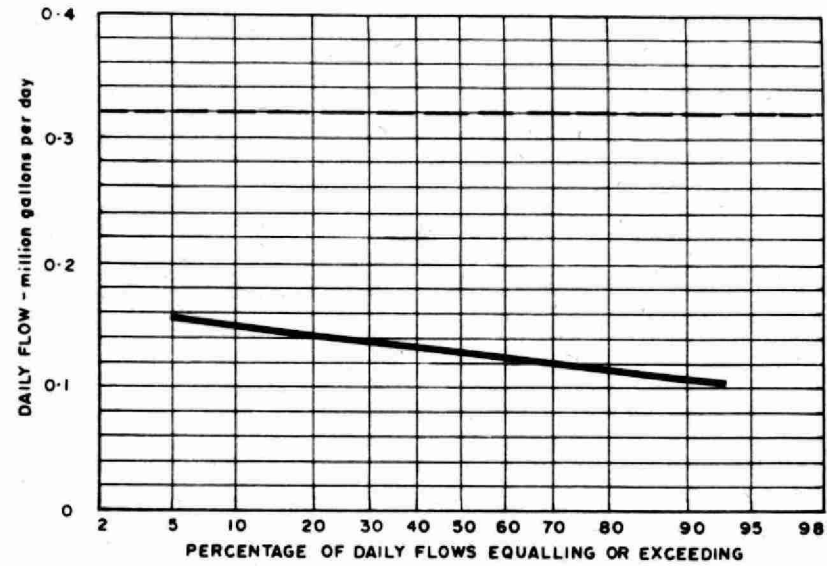
MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	817.49	672.84	-	-	-	135.85	8.80	-	-	-	-	-
FEB	2203.24	995.37	-	-	730.46	-	85.35	-	51.00	205.76	-	135.30
MAR	1324.14	692.35	-	-	394.78	135.85	68.87	-	-	32.29	-	-
APR	1354.38	675.76	16.00	-	382.08	-	8.80	202.13	-	42.23	27.38	-
MAY	1618.00	679.79	64.73	-	359.78	-	73.40	-	69.00	277.11	-	94.19
JUNE	1702.50	729.31	(50.73)	-	380.18	131.25	11.00	338.63	-	162.86	-	-
JULY	1737.32	673.99	279.81	-	383.98	-	77.68	-	265.00	56.86	-	-
AUG	1641.47	680.08	283.21	-	324.38	(2.70)	-	69.94	18.00	159.27	109.29	-
SEPT	2322.13	651.74	408.72	-	333.48	131.25	76.55	-	-	720.39	-	-
OCT	1342.84	655.56	12.00	-	331.68	-	136.39	-	164.21	15.62	27.38	-
NOV	1996.36	1458.74	-	-	337.02	-	11.00	-	23.00	166.60	-	-
DEC	2514.00	1237.14	-	-	354.48	111.84	79.03	-	38.50	532.33	27.38	133.30
TOTAL	20573.87	9802.67	1013.74	-	4312.30	643.34	636.87	610.70	628.71	2371.32	191.43	362.79

Brackets indicate credit.

* Sundry includes sludge haulage costs of \$1,080.00



FLOWS

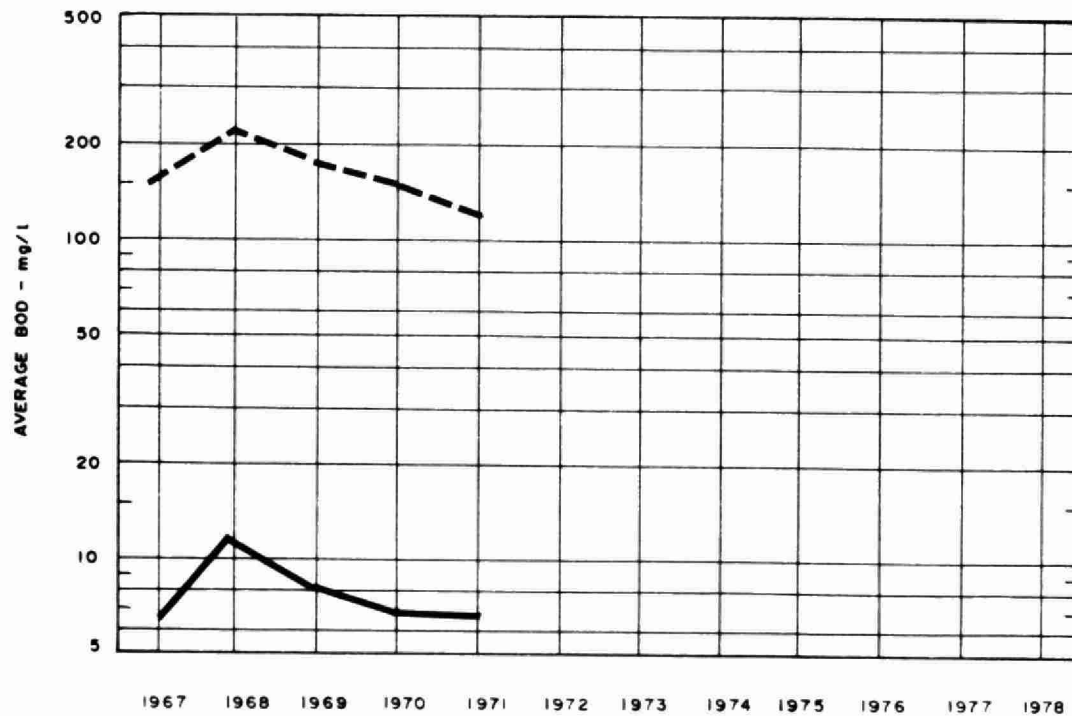
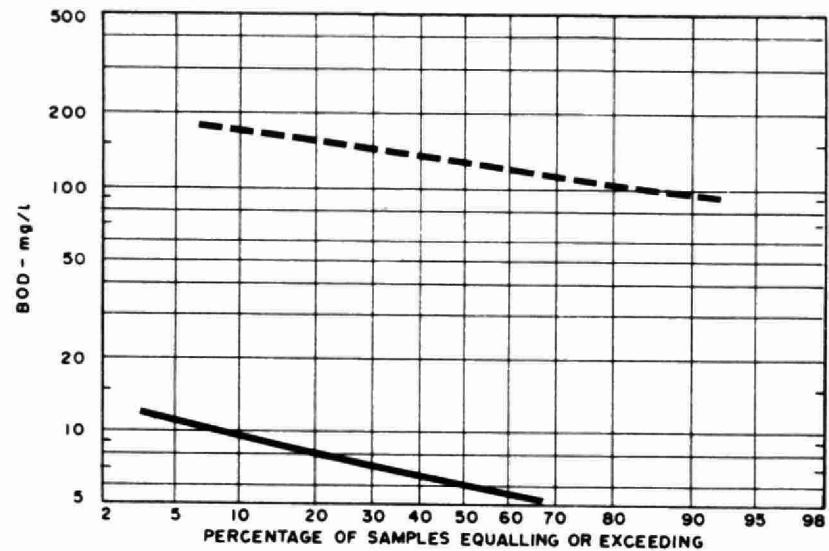


DESIGN CAPACITY — — — — —

PLANT PERFORMANCE

MONTH	FLOWS				BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				TOTAL PHOSPHORUS		
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	MAXIMUM RATE	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION
	million gallons	mil gal	mil gal	mgd	mg/l	mg/l	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	mg/l as P	mg/l as P	%
JAN	3.70	.12	.17	-	167	7	96	5.9	177	13	93	6.1	23	11	52
FEB	3.81	.14	.27	-	142	6	96	5.2	143	9	94	5.1	11	7	36
MAR	4.39	.14	.19	-	119	6	95	5.0	124	9	93	5.0	11	8	27
APR	4.02	.13	.16	-	114	18	84	3.9	116	24	79	3.7	17	10	41
MAY	3.90	.13	.14	-	120	8	93	4.4	124	11	91	4.4	11	13	0
JUNE	3.80	.13	.17	-	131	5	96	4.8	161	7	96	5.9	15	10	33
JULY	3.61	.12	.16	-	126	6	95	4.3	123	7	94	4.2	11	11	0
AUG	3.41	.11	.23	-	107	5	95	3.5	112	9	92	3.5	9	11	0
SEPT	3.42	.14	.16	-	114	5	96	3.7	120	6	95	3.9	15	9	40
OCT	3.58	.12	.14	-	139	6	96	4.8	120	10	92	3.9	11	8	27
NOV	3.67	.12	.15	-	133	6	95	4.7	114	10	91	3.8	9	7	22
DEC	4.67	.15	.24	-	112	7	94	4.9	120	12	90	5.0	8	8	0
TOTAL	45.98	-	-	-	-	-	-	55.1	-	-	-	54.5	-	-	-
AVG.	-	.12	MAXIMUM .27	MAXIMUM -	129	7	94	4.2	129	10	92	4.5	12	9	25
No. of Samples	-	-	-	-	76	76	-	-	76	76	-	-	24	23	-

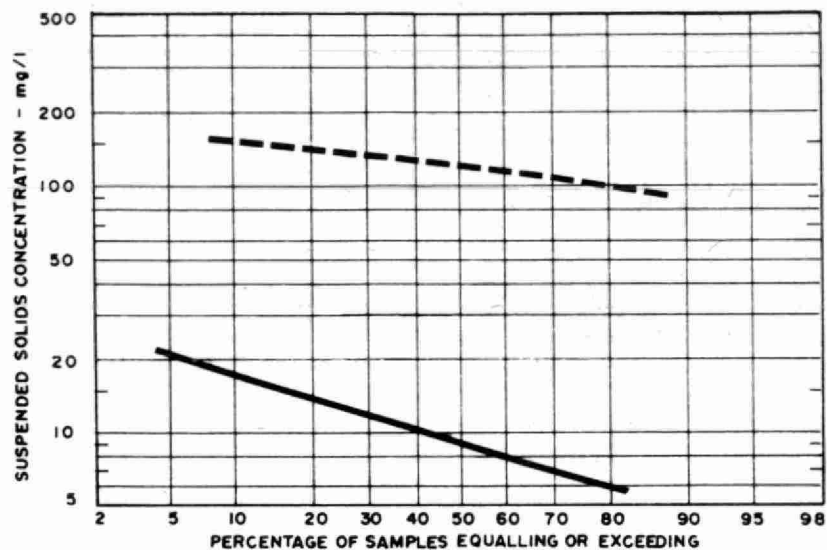
BIOCHEMICAL OXYGEN DEMAND



PLANT INFLUENT - - - - -

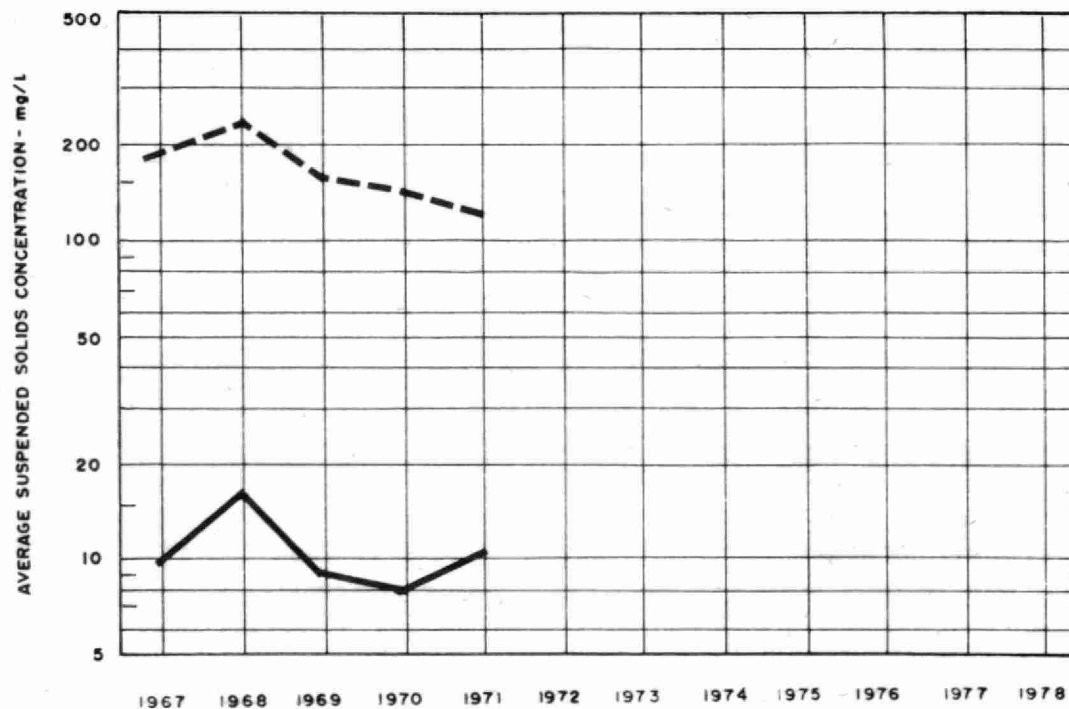
PLANT EFFLUENT —————

SUSPENDED SOLIDS



PLANT INFLUENT - - - - -

PLANT EFFLUENT _____



TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED	CL ₂ USED	AVG. DOSAGE	MLSS. CONC	F/M	AIR USED	QUANTITY	SUSPENDED SOLIDS	VOL. SOLIDS	QUANTITY REMOVED	SUSPENDED SOLIDS	VOL. SOLIDS	AMOUNT HAULED
	cubic feet	pounds	mg/l	mg/l	day ⁻¹	1000 ft ³ lb BOD	10 ³ gallons	mg/l	%	10 ³ gallons	mg/l	%	cubic yards
JAN	9	310	8.4	7770	.02	7.5	24.0	8200	72	0	-	-	0
FEB	8	250	8.7	7700	.02	7.8	10.0	10000	70	0	-	-	0
MAR	9	310	7.1	7500	.02	9.0	30.0	10500	67	22	-	-	131
APR	7	320	8.0	7070	.02	11.1	65.0	14400	65	0	-	-	0
MAY	9	310	8.0	6240	.02	10.2	4.0	10800	64	0	-	-	0
JUNE	8	300	7.9	6080	.02	8.7	25.0	12600	68	13	-	-	77
JULY	9	310	8.6	5100	.02	10.0	10.0	8300	69	17	-	-	101
AUG	9	310	9.1	5430	.02	12.8	24.0	10000	66	0	-	-	0
SEPT	8	300	8.8	6000	.02	9.4	20.0	12400	65	0	-	-	0
OCT.	9	310	8.7	6270	.02	9.0	5.0	13400	67	14	-	-	83
NOV	9	280	8.2	4900	.02	9.2	11.0	11200	75	14	-	-	83
DEC	11	260	5.6	6300	.02	9.0	18.0	11200	69	11	-	-	65
TOTAL	105	3570	-	-	-	-	246.0	-	-	91	-	-	540
AVG.	2.2 cu. ft/mil gal	298	7.9	6360	.02	9.5	20.5	11100	68	7.6	-	-	45

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